
Space Weather Forecast

Issued on Monday, 23 September 2024 at 01:16 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of G1/Minor Geomagnetic Storm intervals, mainly day 3 (25 Sep). Chance of Moderate flares (R1-R2 Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with one Moderate class flare observed, peaking at 22/2139 UTC. This was from the eruption of a "filament" on the southeast disc. This is a line of material (plasma) that collects just above the Sun's surface and can be the source of flares and coronal mass ejections if they are disrupted. This filament was located between two small and relatively simple sunspots, including a recently emerged one. Otherwise the main development out of the seven sunspot regions on the disc was with a small spot on the northwest disc. This saw the formation of a small mixed polarity "delta" spot within its intermediate spots, but also the decay of its leader and trailer spots. The larger, mature region in the south-centre disc is the next most complex, with a number of small developing and decaying spots surrounding its main spot. The other regions are smaller and simpler, although there is some evidence of a new region soon to move onto the southeast limb.

The filament eruption that produced the Moderate flare produced a CME (coronal mass ejection), which has been observed in imagery. This is directed primarily to the south and east, away from Earth, however analysis is ongoing for any Earth-directed component. No other Earth-directed CMEs were observed.

Solar Wind / Geomagnetic Activity: Solar wind speeds declined from slightly elevated, at just over 400km/s to be at background speeds, near 350 km/s. Interplanetary Magnetic Field was weak, with its north-south component also remaining weak, and favouring a positive (northward) direction. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected, with a chance of isolated Moderate-class flares.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs currently feature in the forecast, with analysis ongoing for the Moderate flare CME. Slow wind conditions are expected to persist day 1-2 (23-24 Sep) before the onset of the faster winds from a coronal hole, most likely day 3 (Sep 25). Solar winds are likely to become elevated, only gradually easing late day 4 (Sep 26). Mainly Quiet (Kp 0-2) geomagnetic activity at first with a chance of isolated Unsettled (Kp 3) intervals. The onset of the faster solar winds will then bring a likelihood of Active to G1/Minor Geomagnetic Storm intervals, perhaps later day 2, but most likely day 3 (24-25 Sep), easing to Quiet to Unsettled with Active intervals on day 4 (26 Sep).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to be at background with no Solar Radiation Storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	20	60	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)